

**MODELING AND SOLVING OPEN SHOP COOPERATIVE TASK
SCHEDULING PROBLEMS
BASED ON SATISFIABILITY MODULO THEORIES**

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Received January 24, 2017 ; revised March 11, 2017, March 17, 2017

ABSTRACT. In the manufacturing process, it is necessary to schedule the processing order of machines in order to improve productivity. The scheduling can be modeled as an open shop scheduling problem. However, it has a constraint that multiple machines cannot process the same job at the same time, and is not suitable for cooperative works, such as software development or service engineering. In this paper, we propose a novel model of scheduling for cooperative works, based on an open shop scheduling problem. We also propose two formulations for the model to solve the problem with a Satisfiability Modulo Theories (SMT) solver. This paper aims to expand the range of the scheduling problem not only to manufacturing but also cooperative works.

Key words and phrases. Scheduling, open shop scheduling problem, satisfiability modulo theories, minimum makespan, mixed 0-1 integer programming .